

Notes on North American Willows. III.

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(WITH PLATE IX.)

THE LANATÆ GROUP.—No more striking contribution to our knowledge of American willows was ever made than when in the *Flora Boreali-Americana* was published, simultaneously, three new species of this group. Of these, *Salix Richardsonii* would be recognized at the present day as a close geographical equivalent of one of the most beautiful willows of northern Europe;¹ *S. Barrattiana*, differing more widely from the European prototype, is still said to be “equal to it in beauty,” with “male catkins two inches long, splendidly silky” (Hooker); while the third, *S. Hookeriana*, if apparently less showy than the other two, is more interesting and unique than either. When we consider the marked character of the species and the prominence given to their publication, each having been accorded a full plate illustration, it is strange that two of the number should remain to the present day known to science only through the old type specimens, while concerning the third, which is common on our west coast, there has since been published only Mr. Nuttall’s observations, and quite recently Prof. Sargent’s account of its littoral habitat and tree-like size.

Through the generous assistance of friends afield or having access to the great herbaria of the world, I am happily enabled to break the spell of obscurity which has so long hung over this interesting group. Fresh facts concerning *S. Hookeriana* have been brought together; the long lost staminate aments of *S. Richardsonii* have been found, and that, too, among Dr. Richardson’s own collections; to this species a new variety is added; and, finally, I have the satisfaction to report the rediscovery of *S. Barrattiana*!

I. *S. LANATA* L. Eastern British America north of the Arctic circle and Greenland. (Hook. Arc. Pl.) I have not seen specimens.

¹ Wahlenberg says of *S. lanata*, “Est facile pulcherrima *Salix* in Suecia ne dicam in mundo toto.”

2. *S. RICHARDSONII* Hook. Aments closely sessile, thick, very densely flowered; the male ovate-oblong, usually two on each twig, the terminal one larger ($\frac{3}{4}$ in. thick, $1\frac{1}{2}$ in. long), scales dark, rather acute, densely clothed with very long straight ashy-white or pale fulvous silky hairs; female ament terminal, oblong-cylindrical, 2-3 in. long, densely silky with cinereous hairs above and fulvous toward the base; style conspicuously elongated; stigmas linear, entire or 2-parted.

Hab. Fort Franklin on the Mackenzie River, *Richardson* v. s. in herb. Torrey. Repulse Bay, Aug. 22, 1821 (*Parry?*), herb. A. Gray. Crevices of rocks, Nachvak, Coast of Labrador, July, 1885, *Dr. Bell*.

The figure of this plant given in the *Flora Boreali-Americana* shows a solitary fruiting ament with nearly full-grown leaves on the same twig. This is drawn from "No. 22 Herb. H., B. & T.,"² but Dr. Richardson collected other specimens, both male and female, of the same species, earlier in the season, without leaves, and among these in the Torrey herbarium I am astonished to find the staminate aments which have all along been wanting to complete our knowledge of *S. Richardsonii*. The accompanying ticket reads, "7 feet high, erect and spreading; Fort Franklin, Dr. Richardson." The impression has prevailed that the plant was of more humble stature. Andersson says "*frutex parvus*"—probably a mere conjecture, since no mention is made of the height by Hooker. Indeed, as these earlier specimens *are not numbered* I imagine none like them were sent abroad, and hence the incompleteness of the original figure and description and also the omission of Dr. Richardson's field note as to stature.

Var. *MACOUNIANA*. Leaves orbicular, the earliest obovate, quite entire, less than one inch long and broad, covered when young with floccose hairs, especially on the upper surface, soon smooth, dark green and somewhat shining above, paler and reticulate-veined beneath; aments small for the group, whitish-silky with just a shade of fulvous in the male, scales obtuse, stigmas entire, otherwise as in the type.

² Hooker, Barratt and Torrey, I take it. The willows collected by Richardson, Douglas, Drummond and others were placed in Dr. Barratt's hands to be studied and arranged. He seems to have distributed the specimens into three sets, under corresponding numbers. The most complete set doubtless went to Hooker. The one in the Torrey herbarium is in some respects quite satisfactory, then again provokingly deficient. If Dr. Barratt retained a full set for himself, scarcely a trace of it remained at the time his herbarium came into the possession of Middletown College, so I am informed by Prof. Rice. I am indebted to my friend Dr. Britton for an opportunity to re-examine the interesting old types which fortunately fell to the safe keeping of Dr. Torrey.

South Twin, James Bay. Collected July 17, 1887, by Mr. James M. Macoun, for whom it is named.

“A small, compact bush, 2 to 4 feet high, with just the habit of a garden currant, growing in peaty soil by a small pond in company with *S. arctica*.” This association, taken in connection with the resemblance which the leaves bear to certain Canadian forms of *S. arctica*, might suggest the question whether our plant was due to a cross with that species, but the aments do not show a trace of any such admixture. Had it not been for the intermediate character of the Labrador specimens I should have taken this for an extreme modification, either of *S. Richardsonii*, or of the Greenland *S. lanata*, deserving to rank as a good species. Its occurrence on the level of the plain in lat. $53^{\circ} 20'$, further south than any form of either species mentioned has ever been found before, is in keeping with the essentially arctic vegetation by which it is accompanied and the physical conditions described by Mr. Macoun in his interesting “Notes on the Flora of James Bay” (BOT. GAZETTE, xiii. 113).

Plate IX. *S. Richardsonii* Hook., var. *Macouniana* Bebb. Capsule and stamens $\times 6$.

3. *S. BARRATTIANA* Hook. Alpine swamps in the Rocky Mts., *Drummond!* In thickets at high elevations, Kicking-Horse Lake, *Prof. John Macoun!*

When a species of pronounced character is founded upon a single collection and remains thenceforth for more than half a century known to science only through the type specimens, it is interesting to compare the rediscovered plant with the original description and note in how far, if at all, it may be necessary to modify the characters at first assigned. In Prof. Macoun's specimens, the full-grown leaves, $2\frac{1}{2}$ inches long by $\frac{3}{4}$ inch broad, are elliptic-oblongate, pointed at both ends, not at all “blunt and cordate at the base,” but with this exception the agreement throughout with the excellent description given by Hooker is perfect, even to the “*stipulis glabriusculis*.” This character, omitted by Andersson, would appear to be constant. It presents certainly a striking peculiarity, the like of which I have not observed in any other willow. Set upon a hirsute stem, at the base of silky-pubescent leaves, and thus in marked contrast with the surfaces on either side, we find the stipules yellowish-green and glabrate! The styles and stigmas are reddish-brown. The dark-brown twigs, “marked with the scars of former years' leaves,” are rendered still more shaggy in appearance by

the old, blackened, still clinging stipules. The capsules are rather larger than in the type specimens, with the same bifid stigmas; scale narrower.

I can not imagine why Prof. Andersson went out of his way to give as the habitat of this species, "Near Fort Franklin, subarctic America, Richardson, Douglas," for Richardson never collected *S. Barrattiana* anywhere. Douglas never collected anything at Fort Franklin, and finally the credit belonged exclusively to a third person, not mentioned at all, who found the plant in an entirely different locality, a locality confirmed by Macoun's rediscovery.

4. *S. HOOKERIANA* Barratt. This, as observed by Prof. Sargent, is a small tree 20 to 30 feet in height, with a trunk rarely 12 to 18 inches in diameter, "more often a low straggling shrub with many prostrate stems: on the coast generally along the edge of sea beaches, or in low, rather moist sandy soil." Mr. Howell's experience of the general habit of the species is: "a small tree or large shrub, 10 to 20, or rarely even 30 feet in height, with usually several stems from the same root 4 to 8 inches or more in diameter. It is a plant of the sea coast and salt marshes, usually growing on the margin of ponds, but confined in its range to the immediate proximity of the sea. Very abundant about the mouth of the Columbia, and perhaps the commonest willow of the coast from Port Oxford, near the south line of Oregon, north to Vancouver Island. I have never found it away from the direct influence of the sea. Mr. Nuttall's locality, 'outlet of the Wahlamet,' must be a slip of the pen for outlet of the Oregon (Columbia). I live at the mouth of the Willamette, within a few miles of Wyeth's old station, where Nuttall made his headquarters, and I know that no such tree grows here. I am quite satisfied in my own mind that *S. Hookeriana* does not occur inland, though it might possibly be found near a saline spring."

Dr. Barratt describes the capsules as "glaberrimis," and this is emphasized by Hooker's remark, "pistil perfectly glabrous, even its stipe;" but while true of the type specimens (the capsules of which are past maturity), I find that more frequently the capsules, especially when young, are silky. This is quite noticeable in a form collected by Prof. Macoun on Vancouver Island, and goes to confirm the seeming affinity with *S. Barrattiana*. Furthermore, mixed with the type specimens of *S. Barrattiana*, coll. Douglas, are pistillate aments without leaves, but showing shorter stigmas *invaria-*

bly entire, shorter style and longer pedicel—a manifest variation in the direction of *S. Hookeriana*. We are thus led to recognize as between *S. Hookeriana* of the Pacific coast and *S. Barrattiana* of the Rocky Mountains a relationship similar to that which prevails as between *S. lasiolepis* and *S. irrorata*, *S. lasiandra* and *S. Fendleriana*, *S. Scouleriana* and *S. flavescens*, only that both in habitat and character the difference is more pronounced, for in no one of the parallel cases mentioned is the coast plant confined to the immediate sea shore.

In the Flora Boreali-Americana two widely sundered localities are given for this species, viz.; “Grand Rapids of the Saskatchewan, Douglas. N. W. coast of America, Scouler.” Writing while all the facts were fresh, Hooker seems to have known that the plant had been collected by Scouler on the N. W. coast, but there are no specimens credited to Scouler in the Hookerian herbarium. “There is only one sheet of *S. Hookeriana*, and on it are the analyses which indicate that from this the plate in the Flora Boreali-Americana was drawn. To it is attached a label in the handwriting of Douglas, ‘Near the Grand Rapids of the Saskatchewan, rare—a scrubby, low shrub’” (Baker). The plant figured is identical with that now so well known from all along our northwestern coast. I believe the specimens were collected by Scouler, and that the Douglas ticket, carrying with it the Saskatchewan habitat, was misplaced by Dr. Barratt. The very wording of the ticket, “A scrubby low bush,” is inconsistent with the distant nodes and smooth vigorous shoots of the figure; but, above all, it is incredible that a tree which by the concurrent testimony of all recent observers is known only as growing on the beach or around the brackish ponds of the Pacific coast, should, “once upon a time,” half a century ago, have been found east of all the Rockies and thenceforth escape detection by all subsequent explorers. Beyond this negative evidence, which could scarcely be stronger than it is, there lies another consideration not to be lost sight of. When two species, representative each of the other, are found occupying areas separated by physical features which would appear sufficient to cut off all interchange, one becoming modified by and restricted to a humid coast environment, the other modified by and restricted to a high mountain environment, it is absurd to expect that one will be found invading the area of the other and preserving intact its specific identity.

For my own part, I know too well how prone Dr. Bar-

ratt was to be just a bit careless, to say the least, in arranging loose material, to believe implicitly that the Douglas ticket was rightly placed, against such cumulative evidence to the contrary.

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Intracellular Pangenesis.

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This is the title of a book by Prof. Hugo de Vries, which has just appeared in the German language,¹ and will no doubt create considerable interest. The subject with which it deals is one of the highest importance, and of the manner in which it has been treated I will try to give a short account.

By many investigators of organized nature, and especially by those who have studied the phenomena of heredity, the necessity has been felt of assuming that hereditary characters in animals and plants are the visible effects produced by the nature of those substances which constitute living organisms. Hence many speculations have arisen about the structure which these substances may possess, and about the manner of their dispersion through the living body. However hopeless such attempts to penetrate into one of the greatest mysteries of nature may at first sight appear, some light certainly has been thrown on this matter through the exertions of several distinguished naturalists.

Among these Charles Darwin, without doubt, ought to be named in the very first place, and the chief object of this book is to induce in its readers a more just and higher appreciation of one of the most fertile conceptions of this illustrious author.

But others have studied the same subject, and of these the principal are Herbert Spencer, Haeckel, Nägeli, and Weismann. A comparative and critical consideration of the different views to which the above named authors have been led is the subject of the first part of Prof. de Vries's book.

In the first place, he ably shows that Darwin's so-called provisional hypothesis of pangenesis² essentially consists of two well defined and in many respects independent parts:

1. All hereditary characters of an organism are repre-

¹ Jena, Gustav Fischer, 1889.

² The Variation of Animals and Plants under Domestication. Vol. ii. p. 349.